Clear Sky Tampa Bay

A Regional Framework for Enhancing Resilience through Solar + Storage

The Solid Waste-to-Energy Plant burns approximately 3,000 tons of garbage daily and converts it into up to 75 megawatts per hour of useful energy. [Credit: Pinellas County]

Pinellas County Clear Sky Assessment Process

Prioritizing Solar + Storage for Resilient Facilities & Communities

October 2021

Project Summary

The Clear Sky Tampa Bay project was a 15-month collaborative research effort to support solar + storage deployment for community resilience in Florida. The Clear Sky Decision Support Toolkit is a collection of resources designed to support users in conducting solar + storage prioritization and feasibility screening assessments at critical facilities. The Tampa Bay Regional Planning Council worked with four local governments in the region to test and apply the Toolkit. This case study series describes how each partner government used the Toolkit and highlights key insights and lessons learned that other users can follow to replicate the process. To download the Toolkit visit www.tbrpc.org/clearsky.

Background

Pinellas County applied the Clear Sky Decision Support Toolkit to improve interagency coordination and gather data to analyze solar + storage projects for its critical facilities. This case study examines energy resilience strategies for the Pinellas County Solid Waste-to-Energy Plant. The Toolkit's modular assessment process developed institutional capacity and knowledge within the county and will assist in the research and application of future solar energy projects.

Geographic Context

Pinellas County spans 439 square miles, including nearly 600 miles of coastline, with a population of approximately 290,000 residents and more than 15 million annual visitors. The Pinellas County government owns and operates over 400 facilities. Natural hazards in the county include tropical cyclones, winds and storm surge, tidal influences, and tornadoes.

About the Clear Sky Decision Support Toolkit:

The Toolkit includes a guide and Microsoft Excel-based Decision Support Template organized across five modules to help users assess solar and storage at critical facilities.

Quick Screening Module:
Narrow the scope of analysis from multiple facilities to no more than three. Helps users more quickly eliminate facilities that have limited need for a resilient energy solution or do not meet basic solar siting criteria from further data collection efforts.

Prioritization Module:
Determine the highest priority facility for analysis. Provides a structure for assessing the relative criticality of community functions performed by three facilities based on the facilities' role in supporting FEMA Community Lifelines and other aspects of community resilience.

PV Siting Module:
Helps users evaluate whether the site meets essential installation requirements for PV technology and whether essential power needs could be met by the installation of the PV system.

Critical Load Module:
Establishes criteria for understanding which entities rate the facility as critical and considers the facility's critical functions and associated power requirements.

Utility Engagement Module:
Helps users engage with local utility providers to identify sites for priority restoration and consider surrounding electricity infrastructure and its relationship to the facility in making solar and storage decisions.

Energy and Resilience in Pinellas County, Florida

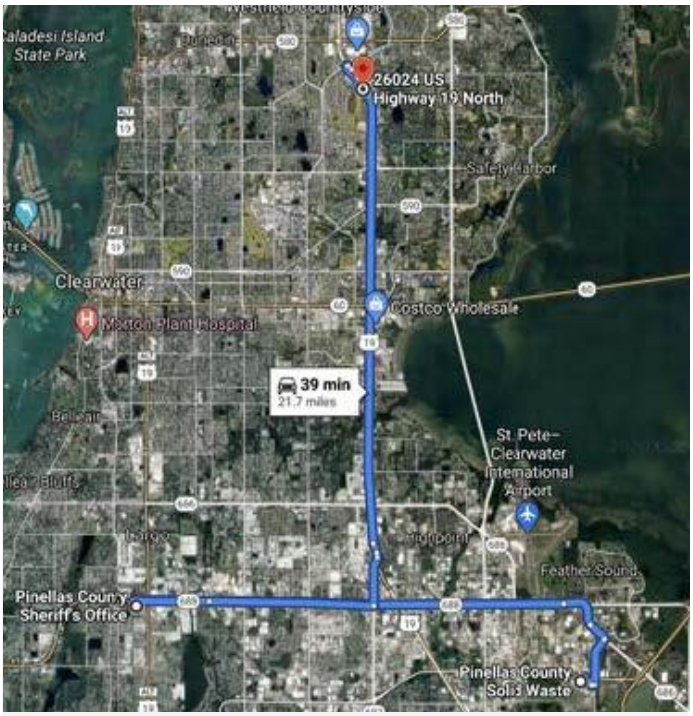
Historically, energy decisions in Pinellas County have been based primarily on funding availability. Staff did not have a standardized assessment process for evaluating and prioritizing solar energy projects and relied heavily on outside consulting services and subject matter experts to conduct siting assessments. This gap in internal staff capacity to conduct assessments motivated the County's participation in the development of the Clear Sky Decision Support Toolkit.

Around the same time that the the Clear Sky Toolkit project kicked off, Pinellas County was also establishing goals to reduce the county's carbon footprint through its Sustainability and Resiliency Action Plan (expected release in 2022) and conducting an inventory of its greenhouse gas emissions.

Clear Sky Toolkit Stakeholders

The Clear Sky Toolkit is designed to facilitate dialogue, data collection, and decision-making across multiple stakeholders.

- **Toolkit Leads:** Sustainability & Resiliency Coordinator (Hank Hodde), Energy Program Coordinator (Karim Molina-Oyola)
- **Additional Stakeholders:** Sustainability and resiliency staff; the Asset Management, Emergency Management, Solid Waste, and Public Works Departments; and Duke Energy.



Locations of the three Pinellas County sites - Public Safety (West), Public Works (North), Solid Waste (East)

Facility Prioritization

Sustainability staff at Pinellas County began the Clear Sky assessment process with three facilities, including their Public Safety Complex, Public Works Campus, and Solid Waste-to-Energy (WTE) Plant.

The Public Safety Complex serves as the headquarters for key government organizations such as the Sheriff's Office and 9-1-1 Call Center, and doubles as an emergency shelter for 700 people. It was built to operate without any outside support during an emergency scenario and it is reinforced to withstand category 5 hurricane winds.

Similarly, the Public Works facility provides essential support to critical infrastructure such as the County's traffic control system, and it is used as an emergency shelter. There are dormitories, sanitary facilities, and a commercial kitchen to accommodate evacuees during hurricanes or other natural disasters. The WTE plant operates 24/7 converting municipal solid waste into electrical energy for much of the county. Each facility was assessed using the Prioritization Module. Based on the results of the analysis, County staff proceeded with further evaluating solar and storage potential at the WTE Plant.

PV Siting Specifications

In the PV Siting Module, sustainability staff reviewed site-specific information that would impact the suitability of a potential photovoltaic (PV) system, including the potential to apply PV on rooftops as well as floating docks in retention ponds.

By completing the PV Siting Module, County staff better understood the importance of considering a roof's age in evaluating the potential for a solar + storage system. In planning for future capital improvements, staff now plan to design projects around construction schedules to coordinate with site renovations.

Community Resilience Factors

The WTE plant is a critical facility that burns most of the municipal solid waste in the county, reducing its volume by 90 percent. As the solid waste is incinerated, it generates up to 75 megawatts (MW) per hour of electricity, some of which is used for the plant itself and the rest (about 60 MW) is sold to the County's electric utility, Duke Energy. The County was already considering the potential of a floating photovoltaic (FPV) system at the WTE plant. The Clear Sky Toolkit provided staff with an additional layer of considerations to enhance the resilience of the plant's energy system.

The electricity produced from the WTE plant powers around 45,000 homes and businesses every day. Staff reported the influential role of the FEMA Community Lifelines (Figure 1) in providing a lens in which to consider the impacts of a loss of critical facility services within the community during a disaster event across multiple sites.

Figure 1. The FEMA Community Lifelines associated with Pinellas County's Waste-to-Energy plant.

Utility Engagement

Pinellas County staff worked with Duke Energy, the city's electric utility service provider, to identify potential project constraints. As a result of this coordination, County staff developed a better understanding of the utility considerations that impact a project, including System Average Interruption Duration Index (SAIDI), System Average Interruption Frequency Index (SAIFI), and Customer Average Interruption Duration Index (CAIDI), and how those indexes translate into expenses that could be saved if a property has a reliable backup source of energy.

Lessons Learned

Pinellas County staff developed its internal capacity to conduct solar + storage assessments through its application of the Clear Sky Toolkit. Staff now have a better understanding of the degree of coordination required to gather data, as well as the multitude of factors that must be considered when assessing the potential resilience impacts of a solar + storage project.

The Clear Sky Toolkit assisted Pinellas County with an important first step in evaluating the WTE plant for a solar + storage investment. It opened lines of communication within and across departments and provided guidance of the information needed to conduct a comprehensive review of siting needs for a successful solar + storage project. It also provided a means for dedicated discussions of the potential energy resilience benefits of solar + storage for critical facilities that must retain essential community services. County staff noted that, at first, the process to understand the questions and explore the different parameters offered in the Toolkit can be time-consuming. However, once the user becomes more familiar with the content, the process becomes more straightforward.

Next Steps

The next steps will include an estimation of the potential financial return on investment through a traditional cost-benefit analysis, as well as further consideration of the value streams associated with a more resilient energy supply. Once a site has been confirmed and properly scoped, the County will implement the potential solar + storage project through its Capital Improvements Program. In addition, staff identified the potential to expand upon the Quick Screening Module to provide additional use and support to the County when researching new solar + storage projects across its large portfolio of buildings.

Tips for Toolkit Users

Additional Tips for Success:

1. Start with the Decision Support Guide and give it to other users before beginning an assessment with the Template.
2. Contact representatives in public safety and emergency management disciplines at the start of the project to identify any predetermined prioritization strategies for public safety buildings and critical facilities.
3. Subject matter experts across departments and disciplines will need to be engaged throughout the process. Identify a main point of contact to coordinate this collaboration.

Clear Sky Tampa Bay

A Regional Framework for Enhancing Resilience through Solar + Storage

This work was authored by The Tampa Bay Regional Planning Council and Pinellas County under Subcontract No. SUB-2020-10331 as part of the Solar Energy Innovation Network, a collaborative research effort administered by the National Renewable Energy Laboratory under Contract No. DE-AC36-08GO28308 funded by the U.S. Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy Solar Energy Technologies Office. The views expressed herein do not necessarily represent the views of Alliance for Sustainable Energy, LLC, the DOE, or the U.S. Government.

Pinellas County, Florida

Hank Hodde - Sustainability & Resiliency Coordinator
Karim Molina-Oyola - Energy Program Coordinator